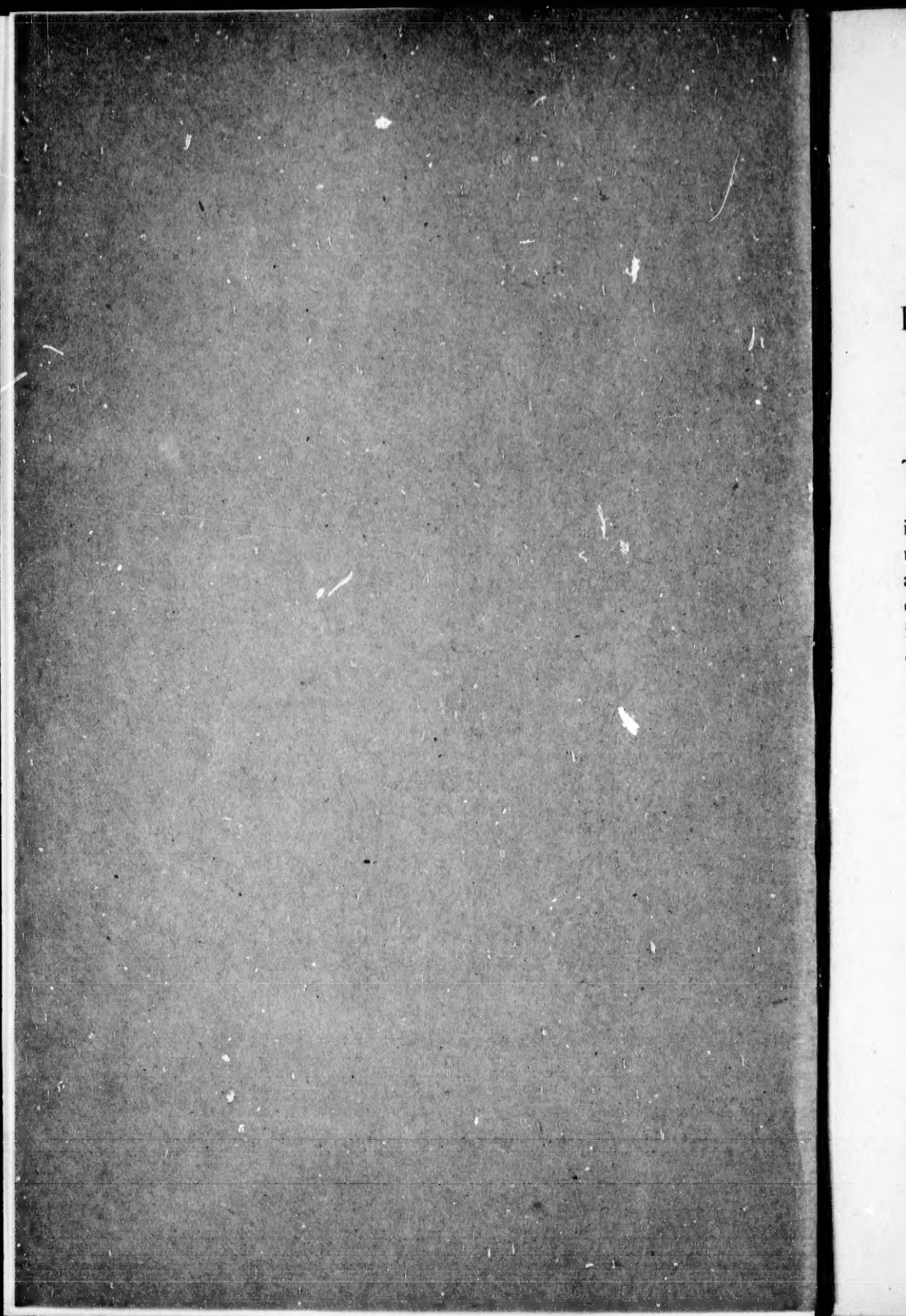


**REPORT**  
**GOLD MINE AT GAY'S RIVER.**

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**BY**  
**ROBERT R. McLEOD.**



## REPORT ON GOLD MINE AT GAY'S RIVER.

BY ROBERT R. MCLEOD.

TO ROBERT D. EVANS, GILBERT PARKER, AND OTHERS:—

GENTLEMEN, — Following your instructions, I have examined the property under consideration, and submit the following report. If the information is not as full and complete at all points as you could desire, it is owing to the great extent and peculiar conditions of the gold-bearing stratum. To fully set forth the limits of pay-ore would require the labor of many months on my own part, and the expenditure of several thousand dollars besides. I have, however, gone far enough to convince myself of the existence of an immense body of gold ore, together with great quantities of auriferous gravel, constituting one of the largest and richest gold-fields on the continent. This is a bold assertion, but I am not at all timid about making it, so well am I borne out by unimpeachable facts.

The Gay's River mines are situated in the Province of Nova Scotia and county of Colchester, in the small village of Coldstream. Running through the partially explored portion is Quarry Brook, a tributary of Gay's River, which is itself a tributary of the Shubenacadie, a considerable river entering Cobequid Bay at Maitland. Since this whole Province is a region but little known to Americans, I introduce here an outline map (Fig. 1) of the same, as the readiest and clearest way of conveying an idea of its extent, geographical position, etc.

The Province has areage of eighteen thousand six hundred square miles, and is divided into eighteen counties. The population, in round numbers, amounts to four hundred thousand. The county of Colchester, in which the mines occur, is outlined

in color on the map, and the black lines show its railway connections with Halifax, Truro, and other parts.

To persons of experience in such matters a mine suggests savage mountain ranges or rocky and rugged regions. To all



Fig. 1.

of this the Gay's River mine presents a complete contrast, for it is situated on a gently undulating country, dotted with old farms and green stretches of timber. Through all this runs a



way con-  
suggests  
To all

convenient carriage road, connecting with two railroad stations six miles distant in opposite directions.

If the mine is unusually situated, it is also of an unusual character. To describe it with adequate clearness will tax all my skill in that direction. If I had but to deal with quartz leads or blanket veins, or any ordinary occurrence of the precious metal, I would not be troubled about the result; but I am about to make a favorable report on a large and valuable property existing under peculiar conditions.

Sometimes the geological part of a mining report is not a vital element, although it always *looks* well, and is in good form; but in this case I confess, that, without the aids of this science, I would be seriously handicapped for the business now in hand.

The whole Atlantic water-shed of the Province of Nova Scotia has for its prevailing country rock a member of the lower Silurian formation, known as Cambrian slates. These slates are



Fig. 2.

intersected with gold-bearing quartz leads, and for the most part lightly covered with a sand and gravel deposit. These rocks, in the counties of Colchester and Hants (adjoining), form extensive outcrops, and thus pass their usual visible boundaries on the west and north. In both these counties this formation is productive of many quartz leads, on some of which, notably at Rawdon, there is a fine showing of gold, and profitable mining going forward.

Here on the Gay's River mines we are on the Bay of Fundy slope or water-shed, and this ancient slate, the oldest of all sedimentary rocks, is for the most part covered unconformably with an immense stratum of the pudding-stone variety of conglomerate. It will be well to rightly understand this word "unconformably," and we can best do so by the diagram (Fig. 2), where one may see that the stratification lines, or bed-

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ding planes, of the conglomerate do not conform or correspond with those of the underlying slate.

Entering the old tunnels hereabouts, one sees the slate is tilted up at an angle of fifteen degrees from a horizontal, and upon it lies the compact mass of conglomerate. We can there, in perpendicular sections, see the exact point of contact between the two kinds of rock, and also clearly observe the condition of that old slate surface before this mass of rocks and mud hid it from the light many million years ago. It was not only tilted up, but it was cracked or fissured at right angles to its dip. All these are important features, and he who reads without heeding them will never understand this gold mine through my report. These cracks extend into the rock to a depth from two to fifteen feet; at some points they are perpendicular, at others, departing a few degrees from it. In width they vary from a quarter of an inch to three inches, narrowing with increasing depth. These seams are sometimes capped over with a later stratum of slate. They are of a special interest, because in most cases, except where they are capped, they have formed natural riffles, and into them great quantities of gold has found its way through the once-moving stones and sand above, before it was solidified into conglomerate. A single crevice or fissure was worked out by Mr. George Gay, a respectable farmer of this place (Coldstream), and now living there, and yielded, in fifty feet in length and twelve in depth, one hundred and five ounces of gold, requiring the work of one man ninety days to extract it. Others have found small bonanzas in these crevices, and, from the best evidences I can obtain, it would be safe to allow that one half the values obtained from the work already done from time to time has been taken from these places in the form of coarse gold, some nuggets weighing one half ounce. In fact, the farmers hereabouts often gave no heed to any other source of profit in this work, casting aside as useless for their purpose the overlying conglomerate that they encountered.

These slates form a considerable range of high hills a mile to the eastward, where they are destitute of any overlying rock. They cleave readily in a perpendicular direction or at right angles to their bedding planes.

At the mines a rock section would be well represented by

Fig. 3, where we see the conglomerate resting upon the slate, and upon that in turn a stratum of gravel, sand, and clay intermixed, all of which has been torn from the conglomerate by the action of ice and water during that comparatively recent time that has been so well named the "great ice age." This stratum of alluvial wash varies in depth from two to thirty feet, and is covered, where not under cultivation, by a growth of pine, spruce, hemlock, and birch, with other trees and shrubs common to this latitude hereabouts.

The stratum of conglomerate varies in depth from a few inches at certain exposures to forty feet at other known points. It rests, as I have already shown, upon a very broken and uneven floor of slate. The superficial extent of this formation has not been determined, but it is known to cover several square miles. If it runs continuous between all the outcrops, then it would



Fig. 3.

have an areage of forty square miles. This conglomerate is gold-bearing, and, together with the gold-impregnated slate, constitutes the gold mines under consideration. Conglomerates of this variety have either formed on the beds of vanished rivers or along the shores of lakes and sea. This we are now considering was formed by the action of the sea; this is evident to any one who knows its character, and has a *little* skill in reading the great "Stone Book." It was, in fact, the bottom of a wide marine bay that extended southward from Cobequid Bay to a point many miles beyond this locality. The tide even now flows up the Shubenacadie River (four miles distant and twenty feet below the mines) to a distance of three miles beyond us. The whole distance between the mines and the Cobequid Bay is characterized by limestone and gypsum deposits, all of distinctive marine origin, and underlying them is the conglomerate formation. Its age in point of geological time is clearly made



out. It belongs to the dawn of the great carboniferous or coal-bearing age, and thus reveals a secret of great interest, for it tells us that even then the more ancient Silurian slates were furnished with gold-bearing quartz leads hereabouts, that must in a measure have been destroyed to furnish the gold of the conglomerate, through which it is disseminated in flattened particles and fine "sights,"—all the evidence of much scouring, pounding, and squeezing. The conglomerate is of course made from the ruin of still older rocks; and when and where they were

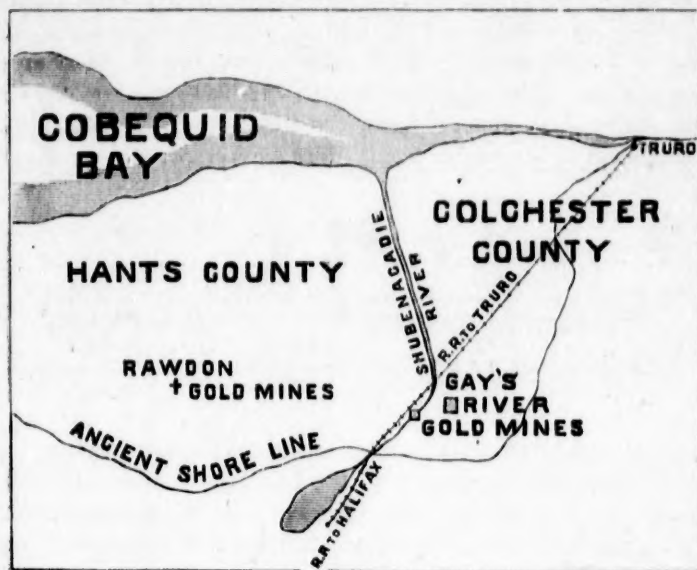


Fig. 4.

formed is not difficult to learn. The well-rounded fragments, of all dimensions, from boulders of a ton in weight to ordinary gravel, are there to tell their own story. A large percentage consists of many varieties of heat-altered (metamorphic) sandstones. Quartz pebbles make a large proportion, perhaps one eighth; the remainder is made of slate from the underlying formation. Shales, mica scales, porphyry, and a cementing matrix composed, roughly speaking, of mud and oxide of iron, are disseminated through it. If we know where to successfully look for the leads from whence came these quartz pebbles, and even

boulders, then we would be upon the source of all this vast amount of gold. Let us then endeavor to restore the old order of things *before* the conglomerate was formed, that we may account for its rocky constituents as well as its included gold, and discover the clue to its origin in the quartz leads.

Some time in that vast unreckoned stretch of centuries between the Silurian and carboniferous ages there was deposited upon these very Cambrian slates upon which the conglomerate now rests many and varied strata of mud and sand ; these, in process of time and subterranean heat, were hardened into sandstones and shales, the heat increasing sufficiently to change the sandstones to quartzites, and freely charge the shales with crystals of iron sulphide. This formation remained as dry land until it was rent and broken by the destroying forces of nature. During this period the underlying slates were covered, and the fissures

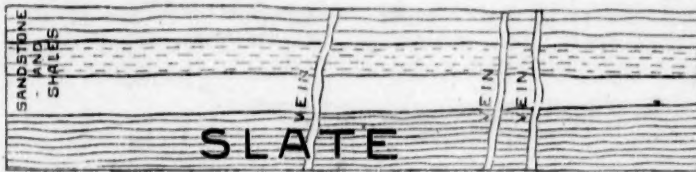


Fig. 5.

extended upward through the later rocks. These fissures were filled with quartz and iron and gold. The accompanying figure (5) will make my meaning clear.

The coal-fields of the adjoining county of Cumberland testify to the instability of the land hereabouts in these days, and this old shore line of the Gay's River region, with its shattered and naked surface sunk below the waters. The fierce tides and waves of a wider Bay of Fundy than now swept over it, and the work of destruction begun by sun and air and rain was taken up by the ocean. The softer shales were ground up into mud ; the quartz from the ruined portions of the veins was broken into fragments, the included metals largely set free, the gold to find its way to or near the bottom, the heaviest lodging in the crevices and seams, dislodging the lighter material by its specific gravity. The altered sandstones, like the quartz fragments, were ground and largely wasted away. The iron sulphides by

chemical interchange became iron oxide, and in that form are distributed through the conglomerate and even permeate the cleavage planes of the underlying slates in large quantities. Thus amid the work of destruction the conglomerate was begun. When completed it was of far greater depth than now, for fragments of it, clinging to the slate, can be seen one hundred feet above its present level on the hill to the eastward, as Fig. 6 will plainly show.

The mica it contains was either derived from granite or mica schist, more probably the former; as its presence in the form of an eruptive dike, now buried, would only be in keeping with its character in other portions of the Province.

If my reading and interpretation of this rocky chapter be correct, then the gold-bearing leads that supplied such vast

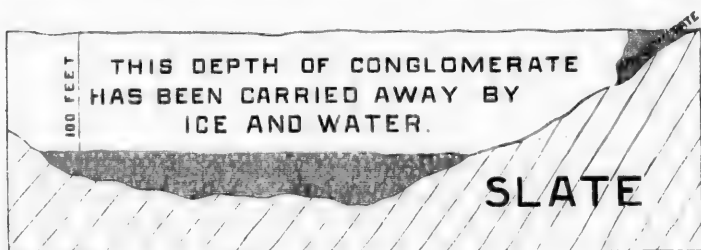


Fig. 6

quantities of the precious metal are still to be found under the conglomerate in the underlying slate, the upper portions only being broken up, while all the greater depths remain, constituting great gold mines in themselves.

This is the conclusion, and a rosy view it is to take of the matter; but I can make nothing else of it, and any course of argument that leads elsewhere soon lands me into absurd contradictions. You, gentlemen, are, in so important a matter, entitled to the key of my decipherment, and may follow me if you will.

In the first place, in proof that the old sandstones that went so largely to the making of the conglomerate were penetrated with quartz veins, as my theory demands, the rounded fragments are to be seen in plenty with the veins running through them, formed while the sandstone was in place as a continuous formation.

In the second place, these underlying slates and quartzites are gold-bearing all over the Province. I say quartzite, because this rock now underlies the slate, as in Fig. 7.

These rocks are producing gold-bearing leads twenty miles to the westward, at Rawdon; also on the east twelve miles, at the south branch of the Stewiacke River. They are penetrated by great numbers of unprospected quartz leads, carrying at any rate several of the base metals, at Wittenberg, four miles to the eastward. Two miles distant, on the uplift of slate to the eastward, there is an exposure of the slate revealing three leads heavily mineralized with iron and copper sulphides, and running in a direction to underlie the gold-fields.

Then, again, it would be idle to suppose that the coarse material from which the conglomerate was formed was brought by

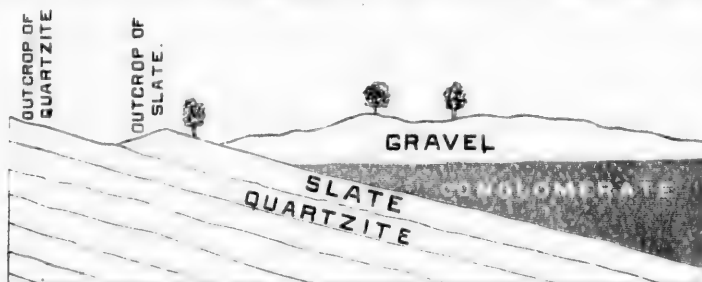


Fig. 7.

some foreign agency, from a considerable distance, thus transporting even the gold (much of which is coarse, sometimes in nuggets weighing an ounce) from afar. Water is evidently the sole agent, and that not a rushing river, but a slowly destructive invasion of the ocean.

The supposition that the gold-bearing leads are distantly removed is all the more absurd when one considers that there is no more favorable and probable place for them than on that very ground.

In the mining world, quartz and gold are always associated. Even if it be found as an exceptional occurrence in other company, it had first to be forced from its earlier companionship. That the gold of Gay's River was derived from quartz may be proven to any one, for the quartz in the conglomerate not unfre-

quently contains it. I will leave this matter here as an encouraging adjunct: "the substance of things hoped for, on the evidence of things *seen*."

I am confident that further development will reveal the presence of these leads within a distance of one half mile of the present workings, which in no case have traversed the slate more than four hundred feet at right angles to the regular and well-known east and west strike of leads, not only hereabouts but all over the Province. Any one conversant with gold mining in Nova Scotia will know that in this short distance, even in a well-known district of leads, it would be no uncommon experience *not* to encounter a single one.

Having now viewed the general features of the district, we come to a more specific account of them. The first discovery of gold at this point was made as far back as 1862. From that date until within ten years, considerable work was done in a very disconnected and primitive fashion, for the most part by the farmer folk hereabouts. For the most part, the object was to obtain the gold that lay in the transverse fissures or cracks of the underlying slate. These, of course, were covered by the conglomerate. To reach them, small tunnels, or rather burrows, were made, and the fortunate man was he who struck a "seam," as they termed it. It was perceived after a time that the conglomerate itself was gold-bearing, and in some cases it was roughly broken up, and run through short sluice boxes without quicksilver, no attempt being made to secure the fine gold.

Twenty years ago Mr. McDonald built a small mill of eight stamps of only four hundred pounds each. The whole concern, judging from its ruins to-day, bore about the same comparison to our best-equipped mills of the same number of stamps as does an ancient flintlock musket to a breech-loading rifle. That, through its inadequate and careless amalgamation, a large percentage of gold was lost, is proven by an examination of the old tailings, now rich in gold amalgam; and yet, in spite of all these great disadvantages, Mr. McDonald kept this apology for a mill running for seven years, and all this time upon the ore contents of a *single area* (150 feet x 250 feet, No. 4, Block 2), and upon his sworn returns to the Mines office, he took \$29,771 in smelted



gold. From this same area had been taken, by its previous owner, Mr. George Gay, an aggregate sum of \$4,000. I here furnish a cross, or north and south, section through this area, and project its surface to the southward (Fig. 8).

When this work was completed, Mr. McDonald had exhausted his own ground, and raised the prices of adjacent areas, that were for the most part owned by the farmers thereabouts. He did not attempt to buy them out, but he declared there was no money in such mining, and patiently set himself to work to get by waiting what was not to be had by him in any other way. He allowed his mill to rot and rust into ruins, and all through ten years he hung about the Mines office and took areas adjoining him, or in the vicinity, that others had failed to keep the



Fig. 8.

titles renewed. Others he bought cheap, or had his friends as partners to purchase them, until himself and two associates held areas around the one he had years ago worked out. And this constitutes the mining property I was to report upon.

This chapter is worth relating thus, because it furnishes valuable evidence of McDonald's good opinion of the ground; and he knew it *better* than any other man.

In working out his ground, Mr. McDonald mined the conglomerate from the bed-rock upwards, in many portions to a distance of fourteen feet, and never pierced the roof, and consequently never learned how much ore he left above him. Much of the slate was mined and milled, for all its interstices along the cleavage lines were charged with gold. The body of conglomerate is in the form of a great wedge with the point turned southward, where the tunnel enters the rock.

The diagram below will show how the formation rests.

The reason for this wedge shape is now very apparent. One sees that the conglomerate near the entrance to the tunnel has been scored away by old surface agencies, while beneath the dip of the slate is furnishing another course for the shape of the conglomerate.

For the clearer comprehension of the relative positions of localities where work has been done, I transfer a portion of the official plan of the district (Fig. 10). The spaces checked off represent mining areas 150 feet x 250 feet. The scale is 500 feet to an inch. The district is divided into blocks of 1,000 areas each, and each area carries its own number.

Upon this plan I have designated the position of the road and stream, and other features that may help to a better under-

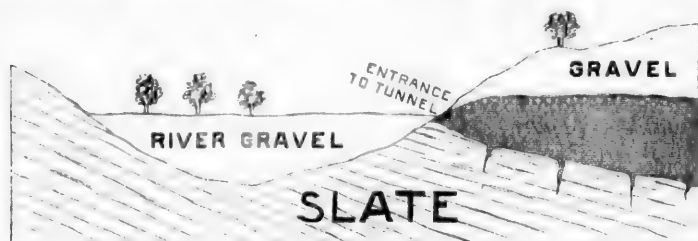


Fig. 9.

standing of affairs. This portion of the plan includes portions of four blocks, and that will explain the apparent confusion of the numbers. Upon such areas as work of any consequence has been done, I have designated by coloring them.

I now proceed to describe something of the work done here and there with the aid of this plan: Beginning at Area No. 1, Block 2, and within 50 feet of the base line is a bank or low bluff, which marks the uplift of the land from the interval. It runs very near to the base line for a distance of 1,000 feet; it then turns a little more to the northward for 1,400 feet, and continues for about one half mile to follow the general course of the stream (Quarry Brook) that runs near to it all the way. This bank or bluff is the old shore of a once broad river that cut away the conglomerate and scored out the underlying slate to an unknown extent, and then in the course of time filled up a

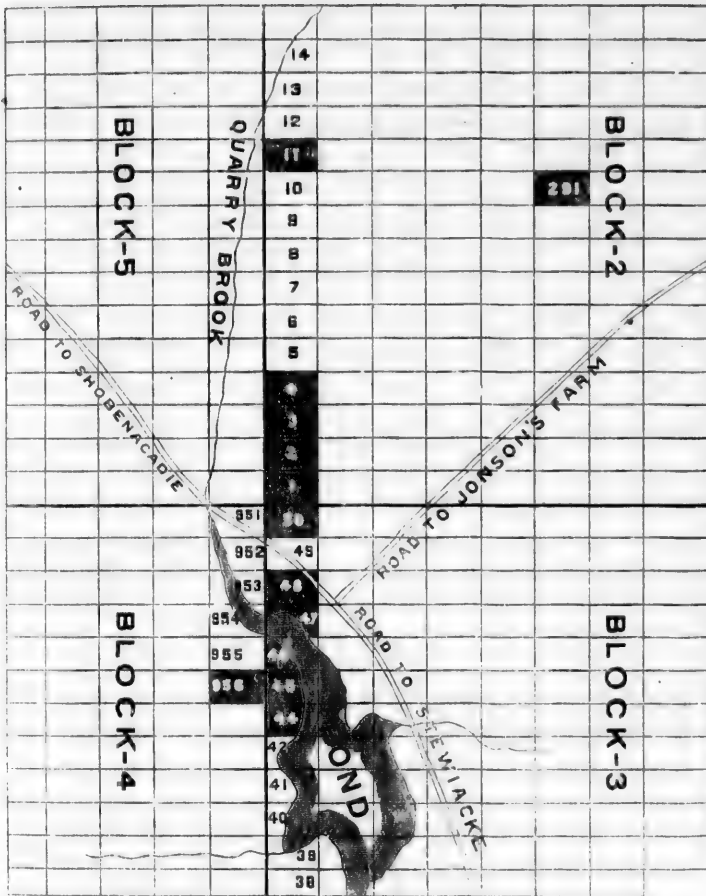


Fig. 10.

level with the line of contact of slate and conglomerate. A north and south vertical section would represent it thus, being about the same diagram introduced on another page —



Fig. 11.

This natural state of things has offered a very convenient entrance to the ore body, and the gravel and gold in the crevices of the slate. It only required the clearing away of the *debris* of gravel, wash, etc., to the slate, and the work could be pushed forward and slightly downward along the dip of the bed-rock. Taking advantage of this state of things, all the areas from 1 to 14 have been broken into from this bank, and more or less work done. Such work was for the most part performed by the farmers hereabouts, in the expectation of discovering a rich "seam" of free gold, and if this was not found after a few dollars had been expended, then operations came to a standstill. On the Areas 5, 6, 7, 8, 9, 10, 13 there are no works that can now be entered without the outlay of considerable money, as the old tunnel entrances are caved, filled with water, and overgrown in some cases with trees. However, the presence of this stratum of gold-bearing conglomerate through the whole distance of two thousand four hundred feet, beginning at No. 1, has been clearly determined. Considerable work was done on No. 11, and any one can be satisfied of the existence of gold, in paying quantities, in the conglomerate that lies about the mouths of the old tunnel. On Areas 1, 2, 3 a few short tunnels have been driven, many years ago, with the object of obtaining gold from the "runs" or crevices, and the prospectors were never wholly disappointed, as several of them still living can now testify.

In working Areas 1, 2, 3, and 50, they mined the slate to a depth of from two to ten feet along the crevices. This slate cleaves very readily and breaks easily, and in working much of it was broken into small pieces; this material was thrown into sluice-boxes and washed, and hundreds of tons of it lie around the intervals. These old sluice-dumps I have repeatedly tested with a pan, and they will still repay milling.

Upon Areas 44, 45, 46, 47, 48, 955, 956 considerable work has been done from time to time until within the last ten years, and never by any mining company or wealthy individual, and yet there is one tunnel on Areas 45 and 46 that could not have been made at a less cost than \$5,000. In spite of the fact that those who made it had no mill, they managed to earn wages by following up the gold-yielding crevices and sluicing the adjacent slates.

On Area 291, Block 2, which is situated twelve hundred and fifty feet northward from the promising work on No. 11, there is a shaft sixty-six feet in depth. The first thirty feet passed through gravel and clay, then followed thirty feet of conglomerate, then six feet of coarse sandstone, and at that point work was suspended a few weeks ago, because those in charge were not intelligent enough to know that conglomerate passes very readily into sandstone and as readily takes its place again. The presence of coarse material makes conglomerate; its absence leaves sandstone. A few feet more would have again revealed the conglomerate and the bed-rock. I make this assertion with confidence, because on some of the areas already mentioned there is to be seen in the works a stratum of sandstone or coarse grit within a few feet of slate and overlying the conglomerate, and surely the same state of things a little distance away should not be a matter of surprise.

The position of this shaft, with its important features, I place in this diagram:—

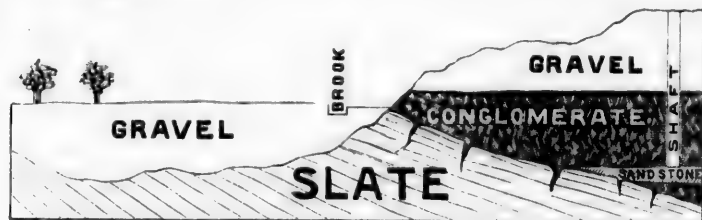


Fig. 12.

It has been conclusively proven that this stratum of conglomerate exists one and one half miles to the northeastward of this shaft. Ore at that point is gold-bearing, and its east and west known boundaries exceed one and one half miles.

The extent of property under consideration includes two hundred mining acres, and are numbered on the official plan of said district (which plan accompanies this report; or they may be identified by that portion of the plan shown on page 13).



It will be seen that it occupies a convenient position, as regards the water supply, and also affords the best opportunity of working the conglomerate from the bank that marks the broken line of conglomerate, before described. Upon inquiry among those who had long ago milled the conglomerate ore in their imperfect fashion, it is always conceded that it would run from \$4 to \$20 per ton. For more definite and satisfactory information, I collected four and four fifths tons of the conglomerate. This I took over a line representing twelve hundred and fifty feet, along the east and west. Beginning at Area 48, Block 3, I took three barrels from an old dump of disintegrated conglomerate in the form of coarse gravel. I only know that it had lain there more than ten years. From Area 50, Block 3, due west three hundred feet, I took from the tunnel fresh blasting, after pumping out the mines, four and four fifths tons. From the old McDonald dump on No. 4, Block 2, due west seven hundred feet from last sample, I took one half ton. This dump consists of the larger stones broken by McDonald from the conglomerate, as he did not wish to mill the broken rocks. Upon these stones when thrown out there was more or less conglomerate. In the course of time it has parted from the rocks, and now, by piling them over, it falls to the bottom. This material, taken out at different points on a large dump of many thousand tons, seemed to me would make a fair sample of the conglomerate, but when it was collected, after considerable difficulty, it contained much more broken slate than seemed satisfactory; but I concluded to take the lean side for a test, and let it go as it was. The old McDonald works at that point were pumped out by steam, after continuous work, night and day, and at different points within the remainder of this sample was taken. To have gone farther to the westward would have involved considerable road making, and by the use of the pan and mortar I was satisfied that there was as good ore as at Area No. 11. This sample was secured, securely headed in barrels, and sent to the mill of the Caledonia Mining Company, at Molega, Queen's County. I was present while it was going to the mill, where it had the closest attention of two experienced amalgamators, and under the direct charge of Capt. W. D. Smart, who has certified to the results as follows:—

MOLEGA, QUEEN'S COUNTY, N. S., July 3, 1890.

R. R. McLEOD:—

DEAR SIR, — The ore shipped from the Gay's River mine resulted as follows:—

Ore milled . . . . .	9,600 lbs.
Result in amalgam . . . . .	38 dwt.
" retort gold . . . . .	22 dwt.
" smelted gold . . . . .	21 dwt.

Making an average of \$4.29 per ton.

Yours with respect,

(Sig.) W. D. SMART,  
*Supt. of Mill.*

The gold yielded I forward with the report, not only that you may see that it has the weight but the superior purity of fineness that makes it worth \$20 per ounce. This conglomerate, we see, yielded at the rate of \$4.29 per ton. This is as fair a showing as I expected, under the circumstances. The operation of milling this ore demonstrated two very important features: 1st, that four tons of it can be put through the batteries while treating one ton of quartz; and 2d, that the gold is easily saved, a great deal of it being coarse, and remaining in the batteries. I will now suppose that a fifty-stamp mill, fully equipped, is ready for action on this property. It will treat two hundred tons of ore per day, at twenty-five cents per ton. Allow for wear and tear of machinery and incidental expenses twenty-five cents per ton; for mining and delivery to the mill twenty-five cents per ton. Presuming that these figures are nearly accurate, we have \$3.44 per ton profit. Allowing that the mill runs three hundred days per year, the amount of ore treated would be 60,000 tons, and the profit would be \$260,640. As there is no reason why the capacity of the mill should be limited to fifty stamps, any one can see what the result would be with a greater capacity. If it seems that the estimate is more favorable to mines than it is likely to realize, even upon that presumption a very satisfactory reduction can be made; and yet, on the bare showing of the

conglomerate, an unusual profit remains. I have explained the occurrence of gold-yielding crevices in slate, and, with such evidence as I have gathered from disinterested persons, I am satisfied that in mining any area there will be at least one quarter as much value taken from these crevices as will be milled from the conglomerate. As I cannot see these crevices with gold in them only as the mine is worked, I will simply call your attention to it as a feature that will far over-balance any weak or lean places that might be encountered in the regular work. I submit for the same purpose the legitimate expectation of discovering the leads from whence came this gold.

Of course the most important question is the ore supply. An area is 150 x 250 feet. Allowing that the conglomerate and slate furnish twelve feet in depth of ore, and we have 150 x 250 x 12, equal to 450,000 cubic feet. Taking the usual estimate

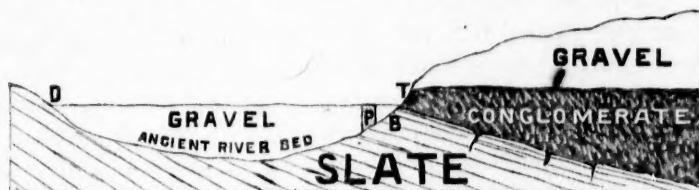


Fig. 13.

of eighteen cubic feet to the ton, we get 450,000 divided by 18, equal to 25,000 tons to one area. Milling this at the rate of 60,000 tons per year would require forty years to exhaust the supply of one hundred areas.

I am not yet done with this remarkable property, for, in addition to the important features already described, there is to all appearances a great body of gold-bearing gravel, that will well repay the expense of sluicing.

The extent of this gravel superficially, within the boundaries under consideration, is about five acres. This has not been tested to any great extent; in fact, till within a few months, no one ever thought there was gold in this deposit.

Its depth must be ascertained by more extensive work than my own time permitted, but the surrounding features indicate pretty clearly that it is from ten to twenty feet in depth. The only test of this gravel has been made at the entrance of

McDonald's tunnel, on Area No. 4, and again resorting to a diagram, and making a section north and south across the areas, say for 1,000 feet, it will be represented by Fig. 13.

Entering the tunnel at T, one sees the dip or incline of bed-rock running north, and directly there it is broken down at B, and filled compactly with a mass of gravel and broken slate. The long level line T D represents the level interval. The slates make an outcrop at D. The gravel-pit P is six feet in depth, and the last three feet are in rich gravel, carrying coarse and fine gold. I tested twelve tons of gravel from this pit in a sluice where the water was connected and cheaply carried near to the pit, and the result was nineteen and one half pennyweights of smelted gold, or a trifle over one dollar and fifty cents per ton. This gravel can be sluiced for ten or twelve cents per ton. How extensive and how rich is this deposit is not now known, but the indications are that it covers about ten acres, and of this amount I should think five acres are within the limits of your property. That this body of gravel should have lain there untested until within one year affords a striking illustration of the lack of thought and enterprise of those who were working there. The gold in this gravel is mostly coarse and easily saved. It is the result of a river breaking down and dissolving the conglomerate, and one may legitimately expect and count upon very rich deposits of free gold in working the gravel upon a large scale. It can be readily handled, either by ordinary sluicing, or by obtaining a head of water and making use of hydraulic force. This deposit may well be called a flattering prospect, but I will simply class it as a valuable adjunct that can scarcely fail to be a contributor to the output of the mine as a whole.

The plan of mining the conglomerate will be extremely simple, requiring nothing more than a rectangular system of tunnels, thus cutting up the ground into available room for extensive work.

Such deposits of gold-bearing conglomerates are found at almost all the gold-fields of Victoria and other portions of Australia, and a good deal of gold has been taken from them. At Queensland, Australia, in the "Peaks Down Diggings," the gold-bearing carboniferous conglomerates lie upon the old Silurian slates and schist, thus forming an exact geological equiva-

lent of Gay's River deposit. Quoting from Mr. B. D. Dorsey, an English mining engineer of standing, he says of the Johannesburg district of South Africa: "The geological formation consists of a series of slates, sandstones, quartzite, and conglomerate, evidently deposited by water. Part of the northern and eastern edge has been tilted up to an angle of twenty-five to forty-five degrees. The formation is similar to that of coal, and will, no doubt, be found as regular as that of coal basins. The gold is contained in the conglomerate in quantities from eight pennyweights to eight ounces per ton. There has been a large number of the conglomerate strata discovered. They vary in width from two inches to many feet, but each one when compared to itself is very uniform to its yield of gold, and in thickness. The conglomerate veins are composed of quartz, quartzite, sandstone, pebbles, the whole being held together by sand, oxide of iron, and clay. As a rule, the pebbles contain no gold. The so-called main reef and the Robinson reef are the principal sources of gold. In the one the ore averages eight pennyweights, and in the other eight ounces. The main reef has been worked twenty-five miles in length and two hundred feet in depth. With very few exceptions, all the mines will pay large profits if properly worked."

Closely related to the mine proper, I now call attention to some general considerations that have a vital bearing upon the value of the property. The supply of water from the brook and mine will be adequate to furnish almost any number of stamps; certainly as many as will be required.

The question of fuel is easily disposed of, for, in addition to the abundance of wood that can be delivered at the mill for \$1.75 per cord, there is coal in plenty at the mines in Pictou County, and could be furnished at rates which would make it but little, if any, more expensive than wood. There is a fair carriage road to Stewiacke, a station on the Intercolonial Railroad, six miles distant northward. In the other direction there is a good highway to Shubenacadie, six miles distant, a station and town on the same railroad. In a direct line to this railroad from Stewiacke station to the town of Truro, the head of Cobequid Bay, the distance by rail is twenty-two miles. At that point there are quite an extensive foundry and machine shops, where



some of the best gold-mills of the Province have been made. From Shubenacadie to Halifax is forty miles, and at that point supplies of all kinds can be obtained. Lumber is made within a mile of the mine, and could be made upon it, as there is a good growth of timber over most of the mining region. The price of lumber varies; for hemlock \$7.50 per M; and pine and spruce are held at somewhat higher figures. Shingles, in plenty, are manufactured within a mile of the mine, and can be purchased for from \$1 to \$1.10 per M. Miners' wages run from \$1.50 to \$1.75 per day. Carpenters receive from \$1.50 to \$1.75 per day, ordinary labor from \$1 to \$1.25 per day. The climate is healthy, and differs but little from that of New England.

And now, gentlemen, I am done with the task assigned to me, and in carrying it out, I have endeavored to be guided by safe methods, and if the conclusions seem immoderately favorable, it is because no others could be reached with the data at hand, and I remain,

Very respectfully yours,

ROBERT R. McLEOD.

Boston, July 28, 1890.